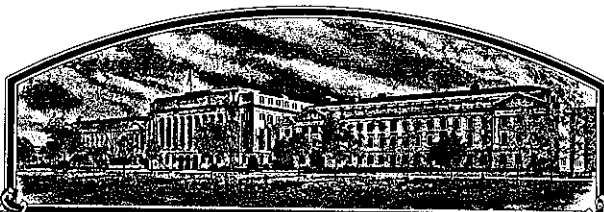


No.

8900074



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME;

## Kansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, (THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM,) TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*\*Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations.)*

WHEAT

'Karl'

In Testimony Whereof, I have herunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 30th day of April in the year of our Lord one thousand nine hundred and ninety.

Attest:

*Kenneth H. Evan*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Clayton Gentler*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) <u>Kansas Agricultural Experiment Station</u>		2. TEMPORARY DESIGNATION <u>KS831374</u>	3. VARIETY NAME <u>Karl</u>
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) <u>Waters Hall, Kansas State University Manhattan, KS 66506</u>		5. PHONE (Include area code) <u>913-532-6147</u>	FOR OFFICIAL USE ONLY PVPO NUMBER <u>8900074</u>
6. GENUS AND SPECIES NAME <u>Triticum aestivum</u>	7. FAMILY NAME (Botanical) <u>Gramineae</u>		FILING DATE <u>Jan. 17, 1989</u> TIME <u>1:30</u> <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. KIND NAME <u>Wheat</u>	9. DATE OF DETERMINATION <u>8-4-88</u>		FEES RECEIVED AMOUNT FOR FILING \$ <u>1800.00</u> DATE <u>Jan. 17, 1989</u> AMOUNT FOR CERTIFICATE \$ <u>200.00</u> DATE <u>Apr. 2, 1990</u>
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) <u>University</u>			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION			12. DATE OF INCORPORATION
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS <u>Vernon A. Schaffer, Department of Agronomy Kansas State University, Throckmorton Hall Manhattan, KS 66506</u>			
PHONE (Include area code): <u>913-532-6115</u>			
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED			
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)			
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement.			
c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)			
d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety.			
e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input checked="" type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input type="checkbox"/> No			
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input checked="" type="checkbox"/> Foundation <input checked="" type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified	
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No			
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No			
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT <u>Kurt C. Feltner</u>		Associate Director, Agricultural Experiment Station	DATE <u>1/10/89</u>
SIGNATURE OF APPLICANT			DATE

Exhibit A. Origin and Breeding History of Karl Wheat

## 1. Pedigree: Plainsman V/3/Kaw/Atlas 50//Parker\*5/Agent

Karl (KS831374) was selected from the cross Plainsman V/3/Kaw/Atlas 50//Parker\*5/Agent, which was made by Dr. E.G. Heyne at Manhattan, Kansas the winter of 1977. The pedigree-head to row method of breeding and selection was used. The  $F_1$  was grown in the greenhouse, the  $F_2$  &  $F_3$  were grown in bulk at Manhattan. The  $F_4$  was grown in head rows at Manhattan and head row selections were made from this cross based upon maturity, short straw and resistance to wheat soilborne mosaic virus and leaf rust. The  $F_5$  generation was grown at 3 locations, Manhattan, Hutchinson, and Oxford, Kansas. Agronomic, disease and protein determinations were made. The  $F_6$  was grown at Manhattan, Hutchinson and Oxford, Kansas and agronomic, disease, protein and yield measurements were taken. Further yield and quality determinations were determined in preliminary, advanced and elite yield trials. The elite test is named the Kansas Intra-State Nursery (KIN), further testing was done in the USDA regional nursery the Southern Regional Performance Nursery (SRPN) and the Kansas Variety Test Nursery (VPT).

Selection and Multiplication Outline

- 1977 Final cross was made to Plainsman V
- 1978  $F_1$  grown in the greenhouse
- 1979  $F_2$  grown in bulk in the field at Manhattan
- 1980  $F_3$  grown in bulk in the field at Manhattan
- 1981  $F_4$  grown as head rows (KS831374 was selected)
- 1982  $F_5$  grown in Preliminary Yield Trial
- 1983  $F_6$  grown in Preliminary Yield Trial
- 1984  $F_7$  grown in Advanced Yield Trial
- 1985  $F_8$  grown in the KIN, heads reselected
- 1986  $F_9$  grown in the KIN, SRPN, 200 head rows composited to make up the original breeders seed
- 1987  $F_{10}$  grown in the KIN, SRPN, VPT, and breeders seed increased at Manhattan
- 1988  $F_{11}$  grown in the KIN, SRPN, VPT, and breeders seed planted

Karl breeder seed was first multiplied in intensively rogued seed blocks.

Karl is uniform. Variants are limited to slightly taller plants, slightly earlier plants, and off-color plants which occur at a frequency of less than 1 in 15,000. Roguing with the objective of eliminating those off-types continues. The variants, as well as typical plants, are commercially acceptable.

Karl is stable. When sexually reproduced the variety remains unchanged in its essential and distinctive characteristics.

## Exhibit B. Novelty Statement

Karl is most similar to Parker wheat. Karl differs from Parker in the following characteristics.

1. Karl is shorter than Parker.
2. Karl is earlier maturing than Parker.
3. Karl is resistant to soil-borne mosaic while Parker is susceptible.
4. Karl is susceptible to Hessian fly while Parker is resistant.



## 11. HEAD:

☐ 1 Density: 1 = LAX 2 = DENSE ☐ 1 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE  
4 = OTHER (Specify) \_\_\_\_\_

☐ 4 Awedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

☐ 1 Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED  
5 = BROWN 6 = BLACK 7 = OTHER (Specify): \_\_\_\_\_

☐ 0 ☐ 6 CM. LENGTH ☐ 2 ☐ 0 MM. WIDTH

## 12. GLUMES AT MATURITY:

☐ 3 Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.)  
3 = LONG (CA. 9 mm.) ☐ 2 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.)  
3 = WIDE (CA. 4 mm.)

☐ 3 Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED  
4 = SQUARE 5 = ELEVATED 6 = APICULATE ☐ 3 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

## 13. COLEOPTILE COLOR:

☐ 1 1 = WHITE 2 = RED 3 = PURPLE

## 14. SEEDLING ANTHOCYANIN:

☐ 1 1 = ABSENT 2 = PRESENT

## 15. JUVENILE PLANT GROWTH HABIT:

☐ 1 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

## 16. SEED:

☐ 1 Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL ☐ 1 Check: 1 = ROUNDED 2 = ANGULAR

☐ 2 Brush: 1 = SHORT 2 = MEDIUM 3 = LONG ☐ 1 Brush: 1 = NOT COLLARED 2 = COLLARED

☐ 5 Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN  
4 = BROWN 5 = BLACK

☐ 3 Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) \_\_\_\_\_

☐ 0 ☐ 6 MM. LENGTH ☐ 0 ☐ 4 MM. WIDTH ☐ 3 ☐ 2 GM. PER 1000 SEEDS

## 17. SEED CREASE:

☐ 2 Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'  
2 = 80% OR LESS OF KERNEL 'CHRIS'  
3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

☐ 1 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'  
2 = 35% OR LESS OF KERNEL 'CHRIS'  
3 = 50% OR LESS OF KERNEL 'LEMHI'

## 18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 2 STEM RUST (Races) ☐ 2 LEAF RUST (Races) ☐ 0 STRIPE RUST (Races) ☐ 0 LOOSE SMUT

☐ 2 POWDERY MILDEW ☐ 0 BUNT ☐ 2 OTHER (Specify) soilborne mosaic virus

## 19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 SAWFLY ☐ 0 APHID (Bydv.) ☐ 1 GREEN BUG ☐ 0 CEREAL LEAF BEETLE

☐ OTHER (Specify) \_\_\_\_\_ HESSIAN FLY RACES: ☐ 1 GP ☐ 1 A ☐ 1 B ☐ 1 C  
☐ 1 D ☐ 1 E ☐ 1 F ☐ 1 G

## 20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Parker	Seed size	Eagle
Leaf size	Plainsman V	Seed shape	Eagle
Leaf color	Plainsman V	Coleoptile elongation	Newton
Leaf carriage	Parker	Seedling pigmentation	Parker

## INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggie and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

## Exhibit D. Additional Description of Karl Wheat

Karl is an increase of 200 composited F9 head rows from the cross Plainsman V/3/Kaw/Atlas 50//Parker\*5/Agent made by Dr. E.G. Heyne in 1977. Karl has been tested in the Kansas Preliminary Yield Trial in 1982-83, the Advanced Yield Trial in 1984, and the Kansas Intra State Nursery from 1985-87. Karl was evaluated in the Southern Regional Performance Nursery in 1986 and 1987 and the Kansas Variety Performance Tests in 1987. It has performed best in central and eastern Kansas, possessing good leaf disease protection and excellent test weight patterns.

Karl is an awned, white-glumed, short, hard red winter wheat. It is equal in height to Plainsman V, or about 5-6cm shorter than Newton. Karl is early, being one day later than Plainsman V, or 4 days earlier than Newton. Its winterhardiness is better than Newton and slightly less than Scout 66.

Karl has a narrow lax leaf during vegetative growth and through jointing. Heading from primary to secondary tillers is non-synchronous and may vary 1-2 days. Initial heading patterns often look irregular compared to some wheats resulting in somewhat irregular appearing plant heights at heading, but plant height will be uniform at anthesis. Karl has a small spike, with usually 12-14 spikelets, it seldom fills more than 2 seeds per spikelet, even under good conditions. The spike at maturity is short, blocky, mid-lax, and contains large seed. The flag leaf during heading and grain filling is narrow and lax. Karl has medium tillering potential and produces small slender stems.

Karl is resistant to soil borne mosaic virus and spindle streak mosaic virus. It has excellent protection against leaf rust and tan spot and is moderately susceptible to stem rust (SR 2), Septoria and Powdery Mildew. It is susceptible to Hessian Fly.



Hard wheat milling and baking quality of Karl is excellent. It compares very closely to Eagle in its overall quality evaluations. Grain protein of Karl is approximately 1% higher than Eagle or 2% higher than Newton.

Breeder's seed of Karl will be maintained by the Agronomy Department, Kansas State University, Manhattan, Kansas, 66506.

Botanical Classification: Karl (KS831374)

I. Plant Characters:

1. Maturity: medium-early
2. Height: midtall
3. Growth Habit: winter

II. Stem Characters:

1. Color: white
2. Strength: midstrong
3. Hollowness: hollow

III. Leaf Characters:

1. Leaf hairs: few, not distinct

IV. Spike Characters:

1. Awedness: white awns 2 - 5.5 cm long
2. Shape: oblong to fusiform
3. Density: middense
4. Position: inclined

V. Glume Characters:

1. Covering: glabrous
2. Color: white
3. Length: midlong
4. Width: narrow to midwide

VI. Shoulder Characters:

1. Width: narrow
2. Shape: oblique at basal and midspike, tending to be rounded and square at the top.

## VII. Beak Characters:

1. Width: narrow
2. Shape: acuminate
3. Length: 4-9 mm

## VIII. Kernel Characters:

1. Color: red
2. Length: midlong to long
3. Texture: hard
4. Shape: ovate

## IX. Germ Characters:

1. Size: small to midsmall

## X. Crease Characters:

1. Width: midwide to wide
2. Depth: shallow

## XI. Cheek Characters:

1. Shape: rounded

## XII. Brush Characters:

1. Size: midsized
2. Length: midlong
3. Collar: no collar

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Table 1. Protein content (%) of Karl and Arkan in KIN nurseries from 1985, 1986, and 1987.

	<u>Arkan</u>	<u>Karl</u>
1986 KIN Statewide Average (6 locations)	13.0	14.0
1987 KIN Preliminary Average (4 locations)	14.1	14.2
1986 KIN Quality Report	12.9	13.7
1985 Kin Quality Report	12.2	12.8
1987 Kin Quality Report	13.4	14.1
Average	13.0	13.8

Table 2. Chemical, Milling, and Baking Data for the Kansas Intrastate Nursery Composites of Hard Winter Wheat Progenies Harvested in 1985. 1/

Variety	C.I. or Sel. No.	Wheat				Flour				Dough Mix Time <sup>3/</sup> min	Loaf Volume	
		Wt. Per Bu.	Ash %	Pro- tein %	Flour Yield %	Ash %	Pro- tein %	Ab- sorp- tion <sup>2/</sup> %	Corrected to 11.5% Protein cc			
Newton		58.0	1.60	11.8	71.3	0.36	10.6	59.4	3 1/2		1013	
TAM 107		57.4	1.50	11.8	72.5	.36	10.7	64.7	4		1053	
Larned		59.6	1.42	11.8	73.3	.37	10.9	59.5	2 1/2		1031	
Arkan		59.5	1.49	12.2	73.7	.36	11.3	57.1	3 1/2		965	
Plainsman V/Odeskaja 51	KS831957	60.8	1.54	14.1	73.1	.36	13.3	59.7	4 1/2		969	
Plainsman V/2*LES	KS82H4	59.8	1.55	12.5	75.1	.42	11.4	59.8	4 1/2		983	
KS73H530//Sage/Art	KS82H144	59.0	1.62	13.5	74.1	.37	12.2	58.1	4		916	
H15H13333/3/5*LES	KS83H134	59.8	1.51	12.6	73.8	.40	11.7	58.9	4 1/2		887	
H15H13333/3/5*LES	KS83H141	60.7	1.59	13.1	71.6	.37	11.9	56.5	2 1/2		925	
PNN/2*EGL/3/LES	KS83H158	60.3	1.52	12.6	73.4	.39	11.4	59.6	3 1/2		937	
PM4/3*CNY/3/OD/2*EGL//PN/Durum	KS82H238-1	59.3	1.49	12.1	73.8	.40	11.1	57.7	4		940	
NWT/3/PKR*4/AG//KAW/ATL	KS831004	61.0	1.63	12.5	72.9	.39	11.4	59.1	3 1/2		950	
KS73167//SD69105/EGL	KS831013	57.5	1.58	12.3	71.4	.38	11.2	61.3	4 1/2		1005	
KS73159/PV	KS831031	59.3	1.47	12.9	72.9	.38	12.1	60.0	4		972	
KS73159/PV	KS831034	58.0	1.70	12.8	72.1	.42	11.6	59.9	3 1/2		1004	
KS73159/PV	KS831036	58.6	1.59	12.9	72.8	.40	12.0	59.7	4 1/2		1003	
NWT/3/PKR*5/AG//ATL50	KS831203	58.7	1.65	12.2	71.5	.38	11.2	58.8	3 1/2		988	
PV/3/K/A//PKR*5/AG	Karl	60.7	1.43	12.8	73.7	.38	11.6	61.6	5 1/2		1005	
PV/ODK 51	KS831936	59.5	1.61	12.7	71.8	.37	12.0	60.0	7 1/2		983	
PV/ODK 51	KS831947	59.8	1.56	12.8	74.0	.40	12.0	60.0	5 1/2		1018	
KS75216/PV	KS82W408	60.1	1.54	12.5	72.7	.43	11.6	59.3	4 1/2		1010	
PV/NWT	KS82W447	59.1	1.61	12.1	71.5	.41	11.3	61.0	5 1/2		1052	
BULK	82C2009	59.8	1.57	12.2	68.2	.35	10.3	59.0	4 1/2		1076	
BULK	82C2032	58.4	1.60	11.6	72.9	.40	10.7	59.9	3 1/2		988	
BULK	82C3242	58.7	1.51	12.6	72.6	.41	11.8	60.7	5		985	

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Table 3. Chemical, Milling, and Baking Data for the Kansas Intrastate Nursery Composites of Hard Winter Wheat Progenies:  
Harvested in 1986. 1/ 2/

Variety	C.I. or Sel. No.	Wheat				Flour				Dough Mix Time <sup>4/</sup> min	Bread Crumb Grain	Loaf Volume	
		Wt. Per Bu.	Ash %	Pro- tein %	Flour Yield %	Ash %	Pro- tein %	Ab- sorp- tion <sup>3/</sup> %	Corrected to 11.5% Protein			cc	
Newton		59.0	1.52	12.0	71.7	0.37	10.6	62.4	4½	S		960	
Arkan		58.4	1.50	12.9	74.9	.38	11.7	59.3	4½	S°		939	
Victory		58.5	1.51	12.7	74.1	.37	11.4	61.2	3½	S		904	
TAM 107		58.5	1.38	12.0	74.2	.36	10.8	67.7	5½	Q		991	
Plainsman V/ Odeskaja 51	KS831957	59.4	1.52	14.3	72.0	.33	13.7	61.2	7	S°		941	
Plainsman V/ 2*LES	Norkan (KS82H4)	59.8	1.49	13.1	74.7	.41	12.1	62.6	6½	S		940	
KS73H530// Sage/Art	Dodge (KS82H144)	59.8	1.52	13.8	75.0	.35	12.8	61.6	5½	S		935	
PV/3/K/A//PKR*5/AG	Karl	59.9	1.46	13.7	74.5	.38	12.8	61.2	6½	S		970	
NWT/3/PKR*5/AG//ATL50	KS831203	58.2	1.64	12.9	71.4 5/	.41	11.9	63.5	4½	S		958	
PV/ODK 51	KS831936	58.2	1.60	13.3	74.0	.42	12.4	63.5	9½	S		955	
Bulk	82C2009	59.8	1.52	12.5	72.2 6/	.43	11.2	61.8	5½	S		998	
PV/KS75216	KS7811-8	58.5	1.46	13.7	74.7	.43	12.6	62.3	6½	S		946	
PV/TAM 105	KS789-28	59.3	1.43	13.4	74.3	.38	12.3	63.1	4½	S		921	
PV/TAM 101	KS787-12	59.1	1.57	13.3	74.4	.43	12.2	62.6	6½	S*		956	
NWT/NE76696	KS7866-16	58.2	1.55	12.5	72.5	.43	11.3	63.0	4½	Q-S		880	
NWT/NE76696	KS7866-15	59.0	1.44	12.2	73.8	.37	11.1	64.4	5	S		938	
PKR76/NWT's*	KS79238-2	60.3	1.52	13.8	72.4	.34	12.6	61.4	3½	S		889	
KS/75216//NWT/PHP	KS78151-6	60.5	1.48	12.7	74.5	.39	11.6	60.6	4	S*		938	
PM4/3*CNY/3/OD/ 2*EGL//PN/Durum	KS82H238-1-1	60.8	1.44	12.4	74.4	.38	11.4	61.3	5	Q-S		897	
"	"	60.3	1.43	12.6	74.0	.41	11.4	63.1	7½	Q-S		915	
"	"	60.4	1.49	12.7	74.5	.43	11.6	63.8	7½	S		926	

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Table 4. Chemical, Milling, and Bread-making Data for the Southern Regional Performance Nursery Composites of Hard Winter Wheats Harvested in Colorado, Idaho, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas in 1986. a, b

Variety	C.I. or Sel. No.	Wheat			Flour			Dough Mix Time <sup>c</sup>			Loaf Volume		
		Wt. Per Bu.	Ash	Pro- tein	Flour Yield	Ash	Pro- tein	Ab- sorp- tion	As Rec'd	Corrected to 12.0% Protein	Bread Crumb Grain	As Rec'd	Corrected to 12.0% Protein
		lbs	%	%	%	%	%	%	min	min	cc	cc	cc
Kharkof Scout 66 TAM-105	1442	57.5	1.60	13.4	73.2	0.48	12.3	58.4	3 3/8	-	S	932	912
	13996	60.1	1.48	13.0	76.4	.39	12.1	59.2	3 3/4	-	S	947	940
	17826	58.0	1.49	12.5	74.2 <sup>d</sup>	.38	11.2	58.4	4 5/8	4 1/8	Q-S	915	972
Plainsman V/3/2/Larned/ Eagle//Sage KS73H530//Sage/Arthur	KS82H4	60.3	1.50	13.6	76.0	.41	12.6	59.4	5 1/2	-	S	950	909
	KS82H144	60.0	1.58	14.3	75.2	.39	13.4	59.1	4 7/8	-	S	998	904
	KS831957	59.4	1.57	14.4	73.5	.39	13.8	62.8	6	-	S	1081	951
Plainsman V/3/Kav/ Atl 50//Pkr*5/Ag		59.6	1.44	14.0	74.5	.38	13.1	61.0	6 1/4	-	S	1078	993
Atl 50/Pkr*5/Ag//Atl 50 Winter Wheat Composite	KS831203	58.3	1.61	13.6	71.4 <sup>d</sup>	.40	12.6	60.2	4 7/8	-	S	1038	992
	KS82C2009	60.4	1.44	12.6	71.0 <sup>d</sup>	.38	11.4	57.4	5 7/8	5 1/2	S	967	1012
Payne//TAM W-101/Amigo Aurora/2-TAM W-101	OK81322	59.3	1.70	12.4	72.7 <sup>d</sup>	.49	11.4	61.7	5 3/8	5	Q	935	978
	OK83396	58.9	1.56	13.5	73.4	.44	12.2	62.8	3 1/4	-	U	918	905
	OK83398	59.1	1.60	14.4	73.1	.43	12.9	61.0	2 1/2U	-	Q-U	948	889
Tona/Chisholm/ Plainsman V Amigo sib/2-Newton	OK83201	60.0	1.54	12.7	74.6	.37	11.7	56.7	3 5/8	3 1/2	S	931	952
	OK82377	60.3	1.48	13.8	73.6	.43	12.6	63.3	3 3/8	-	Q	983	940
	TX81V6180	60.4	1.50	12.6	73.1	.43	11.4	61.6	6	5 5/8	Q-S	1005	1053
TAM-105/TAM W-101	TX81V6183	59.9	1.44	12.5	74.8	.39	11.3	59.9	6 1/8	5 5/8	S	1003	1059
	TX81V6187	60.5	1.48	12.6	75.2	.40	11.3	60.2	6 7/8	6 1/4	Q-S	971	1025
	TX80A135-6	57.8	1.51	12.5	71.6 <sup>d</sup>	.39	11.2	61.2	6 3/8	5 3/4	S	972	1034
WV69-12/TAM W-103 TAM W-101/Newton Short Wheat/Scout	TX78A3345-V42	57.7	1.53	12.9	74.0	.38	11.9	57.5	3 1/2	3 1/2	S	940	947
	TX80A5172-4	59.4	1.55	13.4	72.5	.39	12.2	60.6	3 5/8	-	S	940	926
	TX78V2430-36	59.8	1.52	13.3	76.7	.43	12.0	56.6	4 1/2	-	Q-S	913	913
(TX69A509-2)//Fox													
WV69-103*3/Amigo WV69-101/Ctk//Amigo WV69-194/Osage	TX81V5581	59.0	1.53	12.8	74.2	.44	11.8	62.9	4 5/8	4 1/2	S	955	969
	TX80A5901-1	60.7	1.56	12.3	74.3	.49	11.5	60.4	2 5/8	2 1/2U	Q-U	893	926
	TX84V1227	61.0	1.48	12.9	76.5	.39	11.6	57.4	4 1/4	4	Q	878	904

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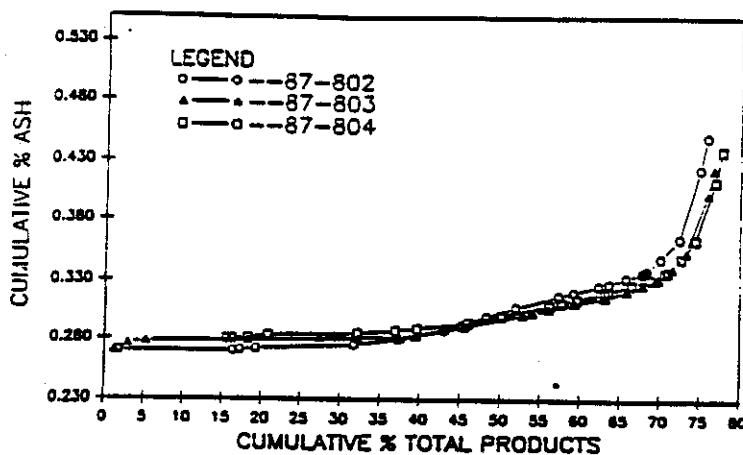
Table 4a. Chemical, Milling, and Bread-making Data for the Kansas Intrastate Nursery Composites of Hard Winter Wheat Composites Harvested in 1987. a, b

VARIETY	WHEAT				Flour Yield (%)	FLOUR		BREAD-BAKING DATA						
	Wt/Bu <sup>c</sup> (lb)	Ash (%)	Protein (%)	Hardness Score		Ash (%)	Protein (%)	Ab-sorp-tion <sup>c</sup> (%)		Mix Time <sup>d</sup> (min)	Corr. Mix Time <sup>d</sup> (min)	Crumb Grain	Loaf Volume (cc)	Regression <sup>c</sup> (cc/%)
Newton	56.5	1.66	12.6	67.5	69.5	0.42	11.1	56.4	4.25	3.79	S	1075	86	
Arkan	56.3	1.68	13.4	64.4	69.3	0.40	12.0	54.9	4.00		S	983	76	
Victory	57.2	1.66	12.7	62.9	71.3	0.41	11.8	56.4	3.25		S	944	72	
TAM-107	56.4	1.54	12.1	59.2	72.5	0.41	11.0	60.3	4.38	3.88	S	1098	88	
Karl	58.1	1.59	14.1	56.3	73.7	0.43	12.9	59.9	5.25	Q	S	1037	82	
KS8010-1-4	57.6	1.68	14.0	61.0	73.2	0.47	12.8	59.0	3.25		S	949	72	
KS8010-1-12	58.0	1.59	13.3	59.2	72.8	0.42	12.2	59.3	3.75		S	968	74	
KS8010-1-20	57.7	1.76	14.6	61.3	72.2	0.45	13.4	57.0	2.38	Q	S	917	69	
KS8010*-34	57.0	1.68	14.0	66.9	71.3	0.45	12.6	59.2	4.13		S	989	77	
KS8010*-71	55.0	1.79	14.1	58.9	69.1	0.44	12.6	59.9	4.13		S	979	76	
KS8010*-73	56.3	1.65	12.4	58.2	70.8	0.43	11.3	57.5	4.13	3.75	S	992	77	
KS8010*-38	57.0	1.67	14.2	59.6	72.1	0.45	13.0	59.9	4.13		S	939	71	
KS8010*-72	54.3	1.67	13.0	60.8	72.5	0.46	11.9	58.6	4.13		S	995	77	
KS8010*-1-3-2	57.3	1.67	13.5	66.6	73.1	0.51	12.3	58.9	3.13		S	966	74	
KS8010*-1-4-2	59.1	1.60	13.1	61.2	74.8	0.47	12.0	57.7	3.00		S	972	75	
KS81580*-10	53.6	1.72	12.4	62.1	70.3	0.49	11.1	59.0	4.50	4.00	Q	983	76	
TB-107	55.3	1.69	12.8	60.3	70.0	0.41	11.5	58.4	2.50	2.38	S	1001	77	
KS84HW196	56.4	1.65	13.2	59.2	72.7	0.40	11.9	58.3	4.00		S	1053	84	
KS85H22	54.4	1.74	13.1	56.8	70.7	0.41	11.9	55.9	2.25	Q-U	Q	973	75	
KS85H136	57.3	1.62	12.7	62.4	71.6	0.42	11.4	58.3	6.13	Q	Q-S	1002	78	
KS85H247	57.6	1.66	13.6	63.1	71.1	0.40	12.2	59.0	5.63	Q	S	990	77	
KS85H274	58.6	1.61	13.4	65.4	72.8	0.39	12.0	56.6	3.63		S	966	74	
NA81WL62	58.0	1.65	13.0	57.7	71.2	0.43	11.8	59.5	4.13	4.00	S	1054	84	
Century	57.3	1.80	12.6	61.3	69.8 <sup>e</sup>	0.52	11.2	59.9	4.38	4.00	S	1040	82	
TAM-200	60.0	1.70	12.6	59.5	69.9 <sup>e</sup>	0.46	11.2	60.4	5.38	Q	S	1098	88	
Dodge	57.5	1.73	14.0	57.1	71.4	0.40	12.7	56.2	4.13		S	963	74	
Norkan	58.0	1.66	13.3	60.2	73.1	0.43	12.4	58.5	4.75		S	1002	78	
Bounty-122	56.3	1.62	12.8	54.6	71.2	0.45	11.7	54.9	2.50	2.38	S	976	75	
OK83396	55.9	1.73	13.2	54.1	69.4	0.46	12.1	62.0	3.50		Q	953	73	
Siouxland	58.2	1.59	12.9	64.7	75.0	0.45	11.7	56.9	3.75	3.63	Q-S	991	77	

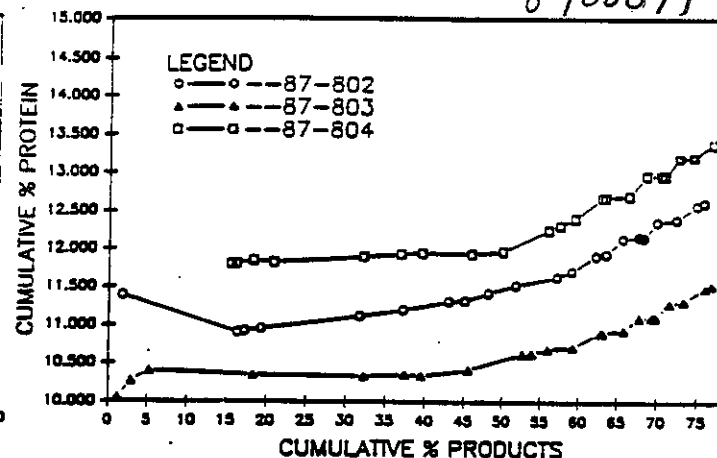
8900074



CUMULATIVE ASH  
GROUP B



CUMULATIVE PROTEIN  
GROUP B 8900074



Preliminary Report 1988 Wheat Quality Council

MILLING PERFORMANCE  
GROUP B

Eagle

87-802 CONTROL : Physical characteristics were lower than expected for this control variety. The weight per bushel was at the minimum acceptable level while the thousand kernel weight was average. Both small kernels and shriveled kernels brought down the wheat kernel size distribution. Milling performance was good but lower than normally expected for this variety. Bran clean-up was very good and appearance of Red Dog was normal.

87-803 : Physical characteristics were equal to or slightly better than the control. Uniformity of kernel size was somewhat poor due to a significant amount of both small and shriveled kernels. Kernel weight was better than the control. Wheat protein and ash were both lower than the control variety.

Milling performance was very good for this sample with total flour extraction being a percent higher than the control sample. Production of sharp, purifiable sizings was very good even though there was slightly more break flour produced for this sample than the control sample. Germ production was also very good. It was more difficult to make comparisons of the degree of bran clean-up and the appearance of the Red Dog due to the inherent lighter color of the bran of the experimental sample, 87-803. Agtron color for the straight grade flour was much better than for the control.

Karl

87-804 : This sample exhibited good overall physical characteristics with average test weight and very good kernel weight. Wheat size distribution was better than the control with uniformly larger kernels. Even though wheat protein was about one percent higher than the control, wheat ash was lower.

Milling performance was excellent for sample 804. Production of coarse, easily purified sizings was very good. Clean middlings from the purifiers and sizings passages converted easily into flour. Clean-up of the bran was equal to or better than the control. Red Dog production was slightly higher than the control at a slightly lower ash content. Total flour extraction was almost two percent higher than the control and at a lower cumulative ash.

8900074

GROUP B		Eagle		Karl
Code No.		87-802	87-803	87-804
Wheat Data		Control		
U.S. Bushel Weight (lbs)		57.83	58.88	60.41
Hectoliter Weight (kg)		74.50	75.90	77.80
1000 Kernel Weight (g) (14% MB)		27.78	30.63	31.37
Overs 7W (%)		52.1	56.3	65.7
9W (%)		47.0	42.7	33.9
12W (%)		0.9	1.0	.4
Theoretical Yield (%)		75.37	75.39	75.62
Sedimentation (14% MB) SDS		57	54	57
Zeleny		55.6	60.5	64.4
Protein (%) (14% MB & N x 5.7)		13.61	12.29	14.32
Ash (%) (14% MB)		1.64	1.59	1.53
Milling Data - Cal. Grades & Values				
Straight Grade Extraction (%)		75.87	76.70	77.73
Ash (% 14% MB)		.450	.424	.439
Protein (% - 14% MB)		12.62	11.53	13.40
Patent (%)		62.25	67.41	65.90
Ash (%)		.326	.326	.326
Protein (%)		11.92	11.08	12.70
Remaining Clear (%)		13.62	9.30	11.83
Ash (%)		1.014	1.135	1.068
Protein (%)		15.82	14.82	17.33
Millfeed (%)		24.13	23.3	22.27
Straight Grade Flour Data				
Protein (%) (14% MB)		12.79	11.70	13.04
Ash (%) (14% MB)		0.46	0.45	0.45
Glutomatic (wet)		31.37	30.70	34.12
Glutomatic (dry)		11.98	11.18	12.82
Astron Color (green)		53	63	56
Starch Damage (Modified AACC)		5.81	6.01	5.92
Falling Number (Sec.) Untreated		445	389	430
Average Micron Size				
Fisher S.S.S.		17.0	15.5	15.4
M.S.A. Sedimentation		54	54	56

89000.74

## GROUP B

CODE NO.		HISTORICAL CHECK	EAGLE CHECK 87-802	87-803	Karl 87-804	
BAKE ABSORPTION						
VERY HIGH	5	3.8	62.73	*	**	
	4			63.16	63.63	
AVERAGE	3					
	2					
MINIMAL	1					
SPECIFIC VOLUME						
VERY HIGH	5	4.0	6.63	6.59	6.71	
	4					
AVERAGE	3					
	2					
MINIMAL	1					
SPONGE CHARACTERISTICS						
SATISFACTORY	5	—	3.88	3.95	3.86	
	4					
	3					
	2					
UNSATISFACTORY	1					
DOUGH OUT OF MIXER						
BUCKY-TOUGH	5	—	3.56	*	3.54	
	4			3.17		
MEDIUM PLIABLE	3					
	2					
WEAK, SHORT-STICKY	1					
DOUGH AT MAKE UP						
BUCKY-TOUGH	5	4.2	3.47	**	3.47	
	4			3.16		
MEDIUM PLIABLE	3					
	2					
WEAK, SHORT-STICKY	1					
BAKE MIXING TIME						
VERY LONG	5	4.2	3.79	**	3.82	
	4			3.32		
MEDIUM	3					
	2					
VERY SHORT	1					

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# GROUP B

CODE NO.		HISTORICAL CHECK	EAGLE CHECK 87-802	87-803	Karl 87-804	
<b>MIXING TOLERANCE</b>						
EXCELLENT	5	4.2	3.67	3.32	3.58	
	4					
AVERAGE	3					
	2					
VERY POOR	1					
<b>CRUMB COLOR</b>						
EXCELLENT	5	—	3.24	3.14	3.27	
	4					
AVERAGE	3					
	2					
VERY POOR	1					
<b>GRAIN</b>						
CLOSE, UNIFORM	5	3.8	3.34	3.24	3.09	
	4					
	3					
	2					
OPEN, UNEVEN	1					
<b>TEXTURE</b>						
SMOOTH	5	3.8	3.47	3.49	3.41	
	4					
	3					
	2					
VERY HARSH	1					
<b>OVERALL BAKING QUALITY</b>						
EXCELLENT	5	3.9	3.57	3.33	3.55	
	4					
AVERAGE	3					
	2					
VERY POOR	1					

\* 0.05 SIGNIFICANTLY DIFFERENT THAN THE CONTROL  
 \*\* 0.01 SIGNIFICANTLY DIFFERENT THAN THE CONTROL

Exhibit E. Statement of the Basis of Applicant Ownership

The variety for which Plant Variety Protection is hereby sought was developed by Dr. E.G. Heyne and Dr. R.G. Sears, employees of Kansas State University Experiment Station. By agreement between the employees and Kansas State University Experiment Station, all rights to any invention, discovery, or development made by the employee while employed by Kansas State University Experiment Station, were assigned to Kansas State University Experiment Station with no rights of any kind retained by the employees.



United States  
Department of  
Agriculture

Agricultural  
Marketing  
Service

Livestock  
and Seed  
Division

8900074

Plant Variety Protection Office  
National Agricultural  
Library Building, Rm. 500  
Beltsville, MD. 20705

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 8900074  
Variety and Kind: Karl Wheat

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

Kansas Agricultural Experiment Station, Kansas State University,

Waters Hall, Manhattan, KS 66506

1/10/89  
(Date)

Kurt C. Jeltner  
(Signature)

Associate Director  
Kansas Agricultural Experiment Station



The Agricultural Marketing Service  
is an agency of the  
United States Department of Agriculture